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# RESEARCH MEMORANDUM

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EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS

OF P-61C AIRPLANES WITHIN THUNDERSTORMS

SEPTEMBER 17, 1946 TO SEPTEMBER 18, 1946

AT ORLANDO, FLORIDA

By

H. B. Tolson

Langley Memorial Aeronautical Laboratory  
Langley Field, Va.

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## NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

## RESEARCH MEMORANDUM

EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS  
OF P-61C AIRPLANES WITHIN THUNDERSTORMS  
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The results obtained from measurements of gust velocities, draft velocities, and ambient-air temperature within thunderstorms for the period September 17, 1946 to September 18, 1946 at Orlando, Fla. are presented herein. These data are summarized in tables I, II, and III, respectively, and are of the type presented in reference 1 for previous flights.

Langley Memorial Aeronautical Laboratory  
National Advisory Committee for Aeronautics  
Langley Field, Va.

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Approved:

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CGB

## REFERENCE

1. Tolefson, H. B.: Evaluation of Gust and Draft Velocities from Flights of P-61C Airplanes within Thunderstorms September 11, 1946 to September 16, 1946 at Orlando, Florida. NACA RM No. L7C20, 1947.

TABLE I.- SUMMARY OF GUST MEASUREMENTS FROM FLIGHTS  
OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity U <sub>e</sub> <sub>max</sub> (fps)	Maximum true gust velocity U <sub>t</sub> <sub>max</sub> (fps)	Gust gradient distance (ft)	No. of gusts	
September 17, 1946 - Flight 37						
Airplane 331 Traverse 1		{ Time (EST) 141133 - 141517 Length of traverse 229.4 sec, 70,647 ft Initial heading (deg) 290				
0 - 3	15,500	----	----	----	0	
3 - 6		2.9	-4.1	6.5	8	
6 - 9		----	-4.1	----	5	
9 - 12		----	----	----	0	
12 - 15		----	----	----	0	
15 - 18		----	----	----	1	
18 - 21		2.2	-2.9	----	7	
21 - 24		----	-2.2	----	1	
24 - 27		2.2	-2.5	----	5	
27 - 30		----	----	----	1	
30 - 33		----	----	----	0	
33 - 36		----	-2.5	-3.0	64	1
36 - 39		----	----	----	----	0
39 - 42		----	----	----	----	3
42 - 45		----	----	----	----	3
45 - 48		2.2	----	----	----	3
48 - 51		4.4	----	----	----	10
51 - 54		2.5	-3.2	----	----	12
54 - 57		1.6	-3.5	----	----	11
57 - 60		3.5	-4.8	----	----	8
60 - 63		----	-3.5	----	----	3
63 - 66		----	-2.5	-6.1	62	2
66 - 69		----	-2.5	----	----	5
69 - 72		----	----	----	----	0
Airplane 331 Traverse 2		{ Time (EST) 143335 - 143523 Length of traverse 120.7 sec, 39,000 ft Initial heading (deg) 120				
0 - 3	16,500	2.8	-4.1	----	6	
3 - 6		2.5	-3.4	----	10	
6 - 9		8.8	-8.5	----	11	

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 17, 1946 - Flight 37					
Airplane 331 { Time (EST) 143335 - 143523 Traverse 2 { Length of traverse 120.7 sec, 39,000 ft Initial heading (deg) 120					
9 - 12	16,500	11.9	-6.6	---	12
12 - 15	16,000	7.5	-8.8	---	10
15 - 18		8.5	-9.7	---	14
18 - 21	16,500	12.8	-6.6	---	8
21 - 24		11.0	-18.8	---	7
24 - 27		11.6	-8.8	---	3
27 - 30	16,000	---	---	---	0
30 - 33		2.5	-3.1	---	6
33 - 36		2.5	-5.9	---	11
36 - 39		---	---	---	3
Airplane 331 { Time (EST) 145325 - 145430 Traverse 3 { Length of traverse 71.2 sec, 21,265 ft Initial heading (deg) 90					
0 - 3	11,000	11.8	-7.1	---	14
3 - 6	11,500	10.5	-6.2	11.3	14
6 - 9		7.8	-8.1	---	12
9 - 12		9.9	-6.5	---	17
12 - 15		1.6	-5.9	---	4
15 - 18		---	---	---	0
18 - 21		---	---	---	0
21 - 24		---	---	---	0
Airplane 345 { Time (EST) - (a) Traverse 1 { Length of traverse 110.2 sec, 34,794 ft Initial heading - (a)					
0 - 3	15,500	3.5	-6.0	-11.2	8
3 - 6		6.4	-8.6	---	8
6 - 9		8.9	-8.0	---	8
9 - 12		5.7	-6.0	---	10
12 - 15		3.2	-8.0	---	7

No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts			
September 17, 1946 - Flight 37								
Airplane 345 Traverse 1		{ Time (EST) - (a) Length of traverse 110.2 sec, 34,794 ft Initial heading - (a)						
15 - 18	15,500	6.7	-7.6	10.9	-----	63	---	7
18 - 21		-----	-2.5	-----	-----	---	---	4
21 - 24		5.1	-4.1	6.1	-----	64	---	6
24 - 27		3.2	-6.7	-----	-----	---	---	2
27 - 30		5.1	-----	-----	-----	---	---	1
30 - 33		2.5	-----	-----	-----	---	---	1
33 - 36		-----	-3.2	-----	-6.7	---	62	2
Airplane 345 Traverse 2		{ Time (EST) - (a) Length of traverse 150.7 sec, 46,612 ft Initial heading - (a)						
0 - 3	15,500	-----	-----	-----	-----	---	---	0
3 - 6		-----	-----	-----	-----	---	---	1
6 - 9		-----	-----	-----	-----	---	---	1
9 - 12		-----	-----	-----	-----	---	---	0
12 - 15		-----	-3.2	-----	-----	---	---	1
15 - 18		-----	-----	-----	-----	---	---	0
18 - 21		-----	-----	-----	-----	---	---	0
21 - 24		-----	-2.5	-----	-----	---	---	3
24 - 27		-----	-----	-----	-----	---	---	2
27 - 30		-----	-----	-----	-----	---	---	0
30 - 33		-----	-----	-----	-----	---	---	0
33 - 36		-----	-----	-----	-----	---	---	0
36 - 39		-----	-----	-----	-----	---	---	0
39 - 42		-----	-----	-----	-----	---	---	0
42 - 45		-----	-----	-----	-----	---	---	0
45 - 48		-----	-----	-----	-----	---	---	0

<sup>a</sup>No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 17, 1946 - Flight 37					
Airplane 345 { Time (EST) - (a) Traverse 3 { Length of traverse 86.7 sec, 24,822 ft Initial heading - (a)					
0 - 3	16,000	2.8	-2.8	8.7	6
3 - 6		17.8	-6.3	----	7
6 - 9		4.7	-14.7	----	11
9 - 12	16,500	7.3	-18.1	----	7
12 - 15		7.2	-9.4	----	6
15 - 18		7.2	-12.8	13.0	8
18 - 21		7.5	-6.3	----	9
21 - 24		3.8	-6.9	----	5
24 - 27		----	-6.9	----	1
Airplane 345 { Time (EST) - (a) Traverse 4 { Length of traverse 71.2 sec, 20,259 ft Initial heading - (a)					
0 - 3	10,500	6.8	-5.6	----	7
3 - 6		3.7	-8.1	----	6
6 - 9		2.5	-9.3	----	6
9 - 12		6.2	-5.9	----	10
12 - 15		5.6	-5.6	6.6	9
15 - 18		4.4	-6.2	-12.3	12
18 - 21		3.1	-2.8	----	5
Airplane 348 { Time (EST) - (b) Traverse 1 { Length of traverse 315.0 sec, 93,366 ft Initial heading (deg) 300					
0 - 3	15,500	----	----	----	0
3 - 6		----	----	----	0
6 - 9		----	----	----	0
9 - 12		5.7	----	----	3
12 - 15		17.2	-5.1	-5.8	9

<sup>a</sup>No records obtained.<sup>b</sup>Clock not installed in airplane.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 17, 1946 - Flight 37					
Airplane 348 { Time (EST) - (b) Traverse 1 { Length of traverse 315.0 sec, 93,366 ft Initial heading (deg) 300					
15 - 18	15,500	19.7	-8.9	----	8
18 - 21	16,000	3.6	-4.4	----	6
21 - 24		1.5	-13.0	----	10
24 - 27		14.0	-12.7	----	9
27 - 30		8.6	-7.6	-13.3	5
30 - 33		5.7	-6.0	----	2
33 - 36		5.7	-8.6	----	6
36 - 39		8.3	-3.5	-19.8	2
39 - 42		5.7	-7.9	----	4
42 - 45		4.4	-3.2	----	4
45 - 48		7.6	-2.5	----	4
48 - 51		6.0	-6.0	----	3
51 - 54		3.5	-7.9	-14.7	5
54 - 57		3.5	-2.9	----	3
57 - 60		6.0	-4.1	----	3
60 - 63		4.1	8.4	144	2
63 - 66		5.7	-4.4	117	6
66 - 69		3.5	-3.8	----	2
69 - 72		7.6	-3.8	----	6
72 - 75		5.7	-3.8	-5.8	4
75 - 78		3.5	----	----	1
78 - 81		8.6	-4.4	----	3
81 - 84		4.8	-3.2	7.3	2
84 - 87		2.5	-6.0	-3.4	4
87 - 90	16,500	2.9	----	----	2
90 - 93		----	----	----	0
93 - 96		----	----	----	0
Airplane 348 { Time (EST) - (b) Traverse 2 { Length of traverse 127.1 sec, 40,141 ft Initial heading (deg) 120					
0 - 3	16,500	----	-6.0	----	2
3 - 6		5.6	-6.0	10.0	3

<sup>b</sup>Clock not installed in airplane.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
September 17, 1946 - Flight 37								
Airplane 348 Traverse 2		{ Time (EST) - (b) Length of traverse 127.1 sec, 40,141 ft Initial heading (deg) 120						
6 - 9	16,500	6.6	-2.8	6.0	-----	152	---	7
9 - 12		11.0	-6.9	-----	-----	---	---	5
12 - 15		16.0	-11.9	-----	-----	---	---	6
15 - 18		10.0	-9.1	-----	-----	---	---	7
18 - 21		10.7	-17.2	14.6	-----	187	---	6
21 - 24		17.6	-10.0	-----	-----	---	---	5
24 - 27		10.0	-10.7	-----	-----	---	---	6
27 - 30		10.7	-8.8	-----	-----	---	---	6
30 - 33		6.6	-----	-----	-----	---	---	5
33 - 36		8.5	-8.5	15.7	-----	123	---	5
36 - 39		5.3	-4.1	5.6	-----	98	---	8
39 - 42		-----	-----	-----	-----	---	---	0
Airplane 348 Traverse 3		{ Time (EST) - (a) Length of traverse 116.3 sec, 34,438 ft Initial heading (deg) - (a)						
0 - 3	11,000	-----	-----	-----	-----	---	---	0
3 - 6		6.8	-----	5.2	-----	236	---	1
6 - 9		5.9	-4.0	11.1	-----	30	---	5
9 - 12		3.1	-3.1	-----	-----	---	---	3
12 - 15		2.5	-2.5	-----	-----	---	---	4
15 - 18		2.5	-2.2	-----	-----	---	---	2
18 - 21		6.2	-4.0	-----	-----	---	---	4
21 - 24		4.7	-2.2	-----	-----	---	---	3
24 - 27		2.5	-3.7	-----	-----	---	---	4
27 - 30		5.9	-2.8	-----	-----	---	---	5
30 - 33		2.2	-2.8	-----	-----	---	---	4
33 - 36		-----	-2.8	-----	-----	---	---	1

<sup>a</sup>No records obtained..<sup>b</sup>Clock not installed in airplane.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 17, 1946 - Flight 37					
Airplane 351 Traverse 1	{ Time (EST) 141336 - 141927 Length of traverse 355.2 sec, 106,390 ft Initial heading (deg) 290				
(a)					
Airplane 351 Traverse 2	{ Time (EST) 143754 - 143936 Length of traverse 116.4 sec, 35,270 ft Initial heading (deg) 50				
(a)					
Airplane 351 Traverse 3	{ Time (EST) - (a) Length of traverse 45.9 sec, 13,190 ft Initial heading (deg) - (a)				
(a)					
September 18, 1946 - Flight 38					
Airplane 348 Traverse 1	{ Time (EST) - (a) Length of traverse 258.5 sec, 94,447 ft Initial heading (deg) - (a)				
0 - 3	21,000	----	----	----	0
3 - 6		----	----	----	0
6 - 9		3.5	----	----	2
9 - 12		----	-2.9	----	1
12 - 15		----	----	----	0
15 - 18		----	-3.2	-7.5	1
18 - 21		2.2	-3.2	6.9	2
21 - 24		2.5	----	3.9	1
24 - 27		----	----	----	0
27 - 30		----	-2.9	----	1
30 - 33		3.5	----	----	1
33 - 36		2.2	-4.8	-11.8	3

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 348 { Time (EST) - (a) Traverse 1 { Length of traverse 258.5 sec, 94,447 ft Initial heading (deg) - (a)					
36 - 39	21,500	8.3	-3.8	----	6
39 - 42		16.5	-14.0	----	4
42 - 45		7.3	-6.7	----	2
45 - 48		11.1	-4.8	----	5
48 - 51	22,000	12.1	-16.5	----	4
51 - 54		8.3	-20.3	----	7
54 - 57		7.6	-13.0	----	5
57 - 60	22,500	1.3	-2.2	7.2	2
60 - 63		----	-7.6	----	1
63 - 66		----	-3.5	----	1
66 - 69		6.0	----	6.8	2
69 - 72		14.0	-8.3	----	8
72 - 75		7.6	-10.2	----	3
75 - 78		6.4	-6.7	-13.6	3
78 - 81		7.3	----	----	1
81 - 84	23,000	----	----	----	0
84 - 87		----	----	----	0
87 - 90		----	----	----	0
90 - 93		----	----	----	0
93 - 96		----	----	----	0
Airplane 348 { Time (EST) - (a) Traverse 2 { Length of traverse 308.4 sec, 111,857 ft Initial heading (deg) - (a)					
0 - 3	20,500	----	----	----	0
3 - 6		6.3	----	----	1
6 - 9		----	----	----	0
9 - 12	21,000	----	-3.2	----	2
12 - 15		----	-5.7	----	1
15 - 18	20,500	----	----	----	0
18 - 21	21,000	7.9	-3.2	5.1	3

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e,max}$ (fps)	Maximum true gust velocity $U_{t,max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 348 { Time (EST) - (a) Traverse 2 { Length of traverse 308.4 sec, 111,857 ft { Initial heading (deg) - (a)					
21 - 24	21,000	5.7	-4.1	----	4
24 - 27		4.4	-11.0	14.9 -16.6	3
27 - 30		9.2	-4.1	----	3
30 - 33		6.3	-4.7	----	7
33 - 36		1.9	-5.4	6.3 -6.5	2
36 - 39		7.3	-3.5	----	3
39 - 42		----	-6.3	----	1
42 - 45		3.8	-7.9	----	2
45 - 48		6.3	----	----	1
48 - 51		----	-4.7	----	1
51 - 54	20,500	6.9	-8.2	----	5
54 - 57		4.1	-4.7	8.3 -73	3
57 - 60		4.4	-7.6	----	2
60 - 63		7.3	-4.4	----	3
63 - 66		4.4	-4.1	-6.0 -257	4
66 - 69		9.8	-6.9	----	4
69 - 72		6.3	-4.1	----	6
72 - 75		8.8	-5.7	----	5
75 - 78		3.5	-6.0	-1.1 -111	7
78 - 81		4.4	----	----	4
81 - 84	21,500	4.4	-3.8	----	2
84 - 87		----	-6.0	----	4
87 - 90		7.6	-10.0	19.0 -101	6
90 - 93		4.1	-3.8	8.5 -107	4
93 - 96		----	----	----	0
96 - 99		----	----	----	0
99 - 102		4.1	----	----	1
102 - 105		----	----	----	0
105 - 108		3.2	-1.9	----	3
108 - 111		----	-3.2	----	1
111 - 114		----	----	----	0

<sup>a</sup>No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts	
September 18, 1946 - Flight 38						
Airplane 348 Traverse 3		{ Time (EST) - (a) Length of traverse 189.2 sec, 67,800 ft Initial heading (deg) - (a)				
0 - 3	21,000	2.2	-3.1	----	2	
3 - 6		----	----	----	1	
6 - 9		----	----	----	0	
9 - 12		----	----	----	0	
12 - 15		----	-5.3	-12.4	428	1
15 - 18		3.4	-2.2	----	----	2
18 - 21		6.3	----	----	----	1
21 - 24		3.4	----	----	----	1
24 - 27		----	-3.4	-5.7	70	2
27 - 30		5.6	----	----	----	1
30 - 33		----	-6.0	----	----	1
33 - 36		4.1	-2.5	----	----	2
36 - 39		----	----	----	----	0
39 - 42		----	-4.4	----	----	2
42 - 45		----	-2.2	----	----	1
45 - 48		2.8	----	----	----	2
48 - 51		----	-3.1	----	----	1
51 - 54		4.4	-3.1	----	----	5
54 - 57		----	-2.2	----	----	1
57 - 60		----	----	----	----	0
60 - 63		----	-2.2	----	----	1
63 - 66		----	----	----	----	0
66 - 69		----	----	----	----	0
Airplane 348 Traverse 4		{ Time (EST) - (a) Length of traverse 113.7 sec, 41,938 ft Initial heading (deg) - (a)				
0 - 3	21,000	4.4	-3.7	----	2	
3 - 6		3.4	----	----	1	
6 - 9		4.4	-3.4	-3.8	71	3
9 - 12		2.5	-4.1	----	----	2
12 - 15		8.7	----	----	----	5

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity U <sub>e</sub> max (fps)	Maximum true gust velocity U <sub>t</sub> max (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 348 { Time (EST) - (a) Traverse 4 { Length of traverse 113.7 sec, 41, 938 ft Initial heading (deg) - (a)					
15 - 18	21,000	7.5	-5.9	----	5
18 - 21		7.3	-5.9	----	5
21 - 24		5.8	-10.9	14.0	9
24 - 27		6.6	-4.1	----	6
27 - 30		6.6	-5.3	----	4
30 - 33		7.2	-5.0	----	5
33 - 36	21,500	6.6	-7.5	----	7
36 - 39		6.6	-6.2	----	5
39 - 42		2.8	----	----	1
Airplane 348 { Time (EST) - (a) Traverse 5 { Length of traverse 400.1 sec, 143,542 ft Initial heading (deg) - (a)					
0 - 3	21,000	----	----	----	0
3 - 6		5.0	-2.2	----	2
6 - 9	21,500	4.0	-3.4	5.9	3
9 - 12		2.5	-4.3	5.2	2
12 - 15		4.0	-1.9	----	4
15 - 18		4.0	-3.4	----	5
18 - 21		3.4	-3.7	----	4
21 - 24		6.2	-3.4	-8.1	5
24 - 27		----	-5.6	-7.0	2
27 - 30		9.0	-5.9	-11.2	3
30 - 33		4.0	-3.7	----	4
33 - 36	22,000	6.8	-5.6	13.5	6
36 - 39		15.8	-16.7	----	7
39 - 42		6.8	-5.9	----	7
42 - 45		8.4	-4.3	----	5
45 - 48		3.4	-7.8	----	4
48 - 51		7.1	-4.3	12.8	5
51 - 54		4.3	-5.0	----	5
54 - 57		4.7	-5.3	8.9	10

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 348 Traverse 5		{ Time (EST) - (a) Length of traverse 400.1 sec, 143,542 ft Initial heading (deg) - (a)			
57 - 60	22,000	5.5	-2.8	---	5
60 - 63		---	-3.4	---	2
63 - 66		11.8	---	---	2
66 - 69		2.5	-1.9	---	2
69 - 72		4.3	-2.8	---	2
72 - 75		4.0	---	---	2
75 - 78		3.4	-7.8	-11.7	3
78 - 81		7.1	-3.4	---	2
81 - 84		---	-3.4	-9.6	2
84 - 87		4.3	-3.4	---	5
87 - 90		---	-3.4	---	1
90 - 93		2.2	-2.2	-5.9	3
93 - 96		---	---	---	0
96 - 99		---	---	---	0
99 - 102		---	---	---	0
102 - 105	22,500	3.4	---	8.6	1
105 - 108		3.1	---	---	1
108 - 111		---	-5.0	-8.2	1
111 - 114		---	---	---	0
Airplane 333 Traverse 1		{ Time (EST) - (a) Length of traverse 280.9 sec, 82,286 ft Initial heading (deg) - (a)			
0 - 3	16,000	5.7	-3.5	---	5
3 - 6		---	---	---	4
6 - 9		---	---	---	7
9 - 12		---	-3.5	---	7
12 - 15		4.8	-4.5	---	5
15 - 18		---	---	---	2
18 - 21		---	-4.5	-14.3	57

<sup>a</sup>No records obtained.

<sup>c</sup>Film supply for accelerometer exhausted before end of traverse.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 333 { Time (EST) - (a) Traverse 1 { Length of traverse 283.9 sec, 82,286 ft Initial heading (deg) - (a)					
21 - 24	16,000	----	----	----	2
24 - 27		----	----	----	2
27 - 30		5.7	----	----	7
30 - 33		----	----	----	2
33 - 36		----	----	----	3
36 - 39		3.8	----	----	4
39 - 42		9.2	----	----	4
42 - 45		17.2	-10.8	----	12
45 - 48	16,500	16.2	-9.9	11.2	28
48 - 51		11.4	-7.3	26.7	152
51 - 54		10.5	-19.1	----	7
54 - 57		6.7	----	16.8	88
57 - 60		7.3	-6.0	8.5	116
60 - 63		3.5	----	----	1
63 - 66		----	----	----	0
66 - 69		----	----	----	0
69 - 72		11.4	-6.7	----	7
72 - 75		17.2	-17.5	----	7
75 - 78		6.7	-18.1	----	-38.5
78 - 81		7.6	-8.3	----	-13.8
81 - 84		----	----	----	65
					93
					10
					0
Airplane 333 { Time (EST) 144230 - 144726 Traverse 2 { Length of traverse 310.0 sec, 93,000 ft Initial heading (deg) 270					
0 - 3	16,000	----	----	----	0
3 - 6		----	----	----	1
6 - 9		4.4	----	----	3
9 - 12		----	----	----	4
12 - 15		5.4	-6.0	----	8
15 - 18		9.5	-4.4	----	6

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 333 { Time (EST) 144230 - 144726 Traverse 2 { Length of traverse 310.0 sec, 93,000 ft Initial heading (deg) 270					
18 - 21	16,000	6.6	-6.6	----	10
21 - 24		12.3	-6.9	----	10
24 - 27	16,500	9.1	-8.5	----	11
27 - 30		4.4	-13.6	----	9
30 - 33		8.5	-6.0	----	11
33 - 36		4.7	-7.9	----	5
36 - 39	16,000	12.6	-3.2	9.2	4
39 - 42		4.1	-3.2	-7.1	5
42 - 45		7.3	-----	-----	1
45 - 48		5.4	-3.5	12.9	4
48 - 51		7.3	-6.9	15.2	8
51 - 54		9.5	-9.5	----	10
54 - 57		5.4	-7.9	----	8
57 - 60		6.6	-6.0	11.1	9
60 - 63		8.8	-8.5	9.5	6
63 - 66		3.5	-6.9	8.6	10
66 - 69		3.5	-7.3	----	6
69 - 72		6.0	-4.1	----	4
72 - 75	16,500	5.4	-6.9	----	5
75 - 78		8.2	-8.2	21.3	8
78 - 81		8.5	-6.3	----	4
81 - 84		-----	-----	-----	1
84 - 87		9.1	-9.5	----	3
87 - 90		19.9	-4.1	6.2	2
90 - 93		3.5	-9.1	----	6
Airplane 333 { Time (EST) 145428 - 145720 Traverse 3 { Length of traverse 193.0 sec, 58,277 ft Initial heading (deg) 180					
0 - 3	16,000	-----	-5.3	-----	6
3 - 6		5.3	-----	-----	1
6 - 9		-----	-----	-----	1
9 - 12		-----	-----	-----	0
12 - 15		-----	-----	-----	0



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts	
September 18, 1946 - Flight 38						
Airplane 333 Traverse 3		Time (EST) 145428 - 145720 Length of traverse 193.0 sec, 58,277 ft Initial heading (deg) 180				
15 - 18	16,000	----	-----	----	2	
18 - 21		-----	-4.4	-----	3	
21 - 24		-----	-----	-----	0	
24 - 27		3.4	-----	-----	8	
27 - 30		-----	-----	-----	8	
30 - 33		7.5	-8.7	15.6	31	7
33 - 36		5.6	-4.1	-----	-----	6
36 - 39		7.8	-----	-----	-----	2
39 - 42		-----	-----	-----	-----	2
42 - 45		-----	-----	-----	-----	0
45 - 48		8.1	-4.4	-----	-----	7
48 - 51		4.4	-6.9	9.2	56	12
51 - 54		6.2	-6.6	-----	-----	6
54 - 57		-----	-----	-----	-----	0
57 - 60		-----	-----	-----	-----	0
Airplane 333 Traverse 4		Time (EST) 150045 - 150207 Length of traverse 160.4 sec, 46,823 ft Initial heading (deg) 290				
0 - 3	16,000	----	-----	----	0	
3 - 6		-----	-----	-----	1	
6 - 9		4.7	-4.7	-----	6	
9 - 12		4.7	-5.6	-15.2	81	9
12 - 15	16,500	14.0	-3.1	-----	12	
15 - 18		6.2	-5.6	-----	9	
18 - 21		12.4	-12.7	-----	9	
21 - 24		19.0	-12.1	10.0	62	7
24 - 27	17,000	15.5	-15.9	-----	5	
27 - 30		6.8	-7.8	-----	8	
30 - 33		5.3	-4.0	-----	2	
33 - 36		7.2	-6.8	12.8	59	9
36 - 39		7.2	-6.8	-----	-----	8

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 333 Traverse 4		{ Time (EST) 150045 - 150207 Length of traverse 160.4 sec, 46,823 ft Initial heading (deg) 290			
39 - 42	16,500	8.7	-5.6	----	11
42 - 45		----	----	----	0
45 - 48		----	----	----	0
Airplane 333 Traverse 5		{ Time (EST) 150910 - 151350 Length of traverse 303.3 sec, 96,361 ft Initial heading (deg) 40			
0 - 3	15,000	----	-5.6	----	4
3 - 6		12.7	-6.8	29.3	8
6 - 9		4.3	-4.3	----	6
9 - 12		7.4	-3.1	7.7	10
12 - 15		5.9	-4.0	----	9
15 - 18		7.4	-12.1	----	8
18 - 21		8.0	-7.4	----	9
21 - 24		5.9	-10.2	----	8
24 - 27		12.4	-19.8	----	15
27 - 30		20.7	-11.4	----	10
30 - 33		8.0	-10.8	----	14
33 - 36		30.3	-6.5	25.7	11
36 - 39		8.7	-18.6	----	7
39 - 42		13.9	-10.2	----	9
42 - 45		7.7	-12.1	----	8
45 - 48		13.6	-9.9	----	7
48 - 51		10.8	-7.4	----	9
51 - 54		16.7	-17.6	33.1	10
54 - 57		10.2	-10.5	----	8
57 - 60		10.2	-7.7	----	9
60 - 63		9.6	-7.4	----	9
63 - 66		3.4	-9.0	----	5
66 - 69		9.9	-4.0	----	7
<sup>c</sup> 69 - 72		5.3	-4.0	9.8	95

<sup>c</sup>Film supply for accelerometer exhausted before end of traverse.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 331 { Time (EST) 142722 - 143100 Traverse 1 { Length of traverse 236.3 sec, 73,106 ft Initial heading (deg) 120					
0 - 3	11,000	4.5	7.9	308	4
3 - 6		4.1	-3.2		6
6 - 9		3.2	-1.9	152	3
9 - 12		3.2	-1.9	88	6
12 - 15		3.2			2
15 - 18		3.8	-4.6		4
18 - 21		3.2	-4.1		6
21 - 24		3.8	-2.6	-6.8	4
24 - 27		3.2	6.6	31	2
27 - 30		12.4	-4.1		5
30 - 33		14.4	-17.2		13
33 - 36		13.7	-4.5		15
36 - 39	11,500	11.1	-12.1		5
39 - 42		4.1	-9.3	128	7
42 - 45		8.0	-4.1	175	8
45 - 48		8.3	-7.7		11
48 - 51		6.4	-6.4		6
51 - 54	12,000		-2.6		1
54 - 57		4.8	-4.1		3
57 - 60		3.5			1
60 - 63		18.8	-5.4		7
63 - 66		11.2	-6.7		7
66 - 69		8.6	-13.8		10
69 - 72		6.4	-6.1	-4.6	7
72 - 75					0
Airplane 331 { Time (EST) 143330 - 143728 Traverse 2 { Length of traverse 250.5 sec, 80,530 ft Initial heading (deg) 270					
0 - 3	11,000	8.3			2
3 - 6		6.7	-2.2	6.2	3
6 - 9		4.8	-1.9		4
9 - 12		6.0	-3.5		4

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 331 Traverse 2		{ Time (EST) 143330 - 143728 Length of traverse 250.5 sec, 80,530 ft Initial heading (deg) 270			
12 - 15	11,000	3.2	-5.1	----	6
15 - 18		3.5	-4.8	----	6
18 - 21		4.1	-2.5	8.9	5
21 - 24		3.5	-2.5	----	4
24 - 27		4.1	-2.2	----	4
27 - 30		4.1	-4.5	----	4
30 - 33		3.2	-2.5	5.4	5
33 - 36		5.4	-3.2	4.1	4
36 - 39		4.8	-2.9	----	7
39 - 42		8.6	-4.1	----	6
42 - 45		7.3	-4.8	----	11
45 - 48		3.2	-3.8	----	4
48 - 51		6.0	-8.0	----	5
51 - 54		9.9	-2.5	----	6
54 - 57		8.3	-9.9	----	7
57 - 60	8.3	-7.6	----	11	
60 - 63	11,500	6.0	-7.6	----	7
63 - 66		5.1	-11.5	----	8
66 - 69		8.0	-4.8	----	9
69 - 72		10.5	-2.2	----	4
72 - 75		2.9	-9.9	----	5
75 - 78		----	-2.9	----	2
78 - 81		----	-2.9	----	3
Airplane 331 Traverse 3		{ Time (EST) 144915 - 145322 Length of traverse 263.3 sec, 79,007 ft Initial heading (deg) 170			
0 - 3	11,000	----	----	----	0
3 - 6		----	-2.8	----	1
6 - 9		3.5	----	----	1
9 - 12		3.5	-3.5	----	3
12 - 15		2.8	-2.5	----	5
15 - 18		3.2	-2.5	5.8	4

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity U <sub>e</sub> <sub>max</sub> (fps)	Maximum true gust velocity U <sub>t</sub> <sub>max</sub> (fps)	Gust gradient distance (ft)	No. of gusts			
September 18, 1946 - Flight 38								
Airplane 331 Traverse 3		{ Time (EST) 144915 - 145322 Length of traverse 263.3 sec, 79,007 ft Initial heading (deg) 170						
18 - 21	11,000	3.8	-2.5	----	-4.1	----	119	4
21 - 24		5.7	-2.5	----	----	----	----	5
24 - 27		5.4	-4.7	7.3	----	187	----	4
27 - 30		3.2	-----	-----	-----	----	----	1
30 - 33		5.0	-2.5	-----	-----	----	----	5
33 - 36		5.7	-5.0	12.0	-----	30	----	8
36 - 39		5.4	-3.2	-----	-5.3	----	117	5
39 - 42		9.5	-5.0	-----	-5.7	----	174	5
42 - 45		-----	-4.4	-----	-----	----	----	2
45 - 48		3.2	-2.5	-----	-----	----	----	2
48 - 51		6.3	-7.9	10.3	-----	60	----	7
51 - 54		9.1	-7.3	4.5	-----	266	----	8
54 - 57		12.0	-5.4	11.4	-----	150	----	8
57 - 60		8.2	-8.8	10.8	-20.7	271	275	7
60 - 63		4.4	-9.5	-----	-----	----	----	7
63 - 66		7.9	-8.5	-----	-----	----	----	8
66 - 69		8.8	-5.7	-----	-----	----	----	7
69 - 72		9.1	-7.9	-----	-17.6	----	293	9
72 - 75		6.0	-6.3	-----	-----	----	----	9
75 - 78		4.7	-2.5	7.8	-----	187	----	3
78 - 81	-----	-----	-----	-----	----	----	0	
Airplane 331 Traverse 4		{ Time (EST) - (a) Length of traverse 162.1 sec, 48,710 ft Initial heading (deg) - (a)						
0 - 3	11,000	-----	-2.8	-----	-----	----	----	1
3 - 6		10.0	-5.0	-----	-----	----	----	4
6 - 9		4.1	-4.1	-----	-----	----	----	4
9 - 12		14.1	-6.3	-----	-5.7	----	203	16
12 - 15		9.4	-5.3	11.5	-----	60	----	9
15 - 18		13.5	-8.5	-----	-9.5	----	236	8
18 - 21		11.6	-13.5	-----	-----	----	----	8

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft $\times 10^3$	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts	
September 18, 1946 - Flight 38						
Airplane 331 Traverse 4		Time (EST) - (a) Length of traverse 162.1 sec, 48,710 ft Initial heading (deg) - (a)				
21 - 24	11,000	14.7	-19.1	----	6	
24 - 27		19.1	-11.3	----	9	
27 - 30		10.0	-14.4	----	8	
30 - 33		15.7	-13.2	----	13	
33 - 36	11,500	11.6	-13.2	----	6	
36 - 39		13.8	-7.5	----	7	
39 - 42		6.6	-13.2	----	9	
42 - 45	12,000	3.1	-----	-----	1	
45 - 48		18.9	-18.2	-----	3	
48 - 51		-----	-----	-----	0	
Airplane 331 Traverse 5		Time (EST) 150800 - 151202 Length of traverse 260.4 sec, 81, 532 ft Initial heading (deg) 40				
0 - 3	11,000	3.7	-----	4.9	62	2
3 - 6		6.2	-3.7	11.2	60	4
6 - 9		9.3	-9.7	-----	180	10
9 - 12		3.7	-7.2	-----	---	4
12 - 15		15.9	-6.6	-----	---	11
15 - 18		12.8	-14.4	-----	---	7
18 - 21		17.5	-8.4	-----	---	9

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e\max}$ (fps)	Maximum true gust velocity $U_{t\max}$ (fps)	Gust gradient distance (ft)	No. of gusts			
September 18, 1946 - Flight 38								
Airplane 331 { Time (EST) 150800 - 151202 Traverse 5 { Length of traverse 260 4 sec, 81,532 ft Initial heading (deg) 40								
21 - 24	11,500	6.6	-13.1	5.7	-6.2	202	119	7
24 - 27		9.7	-8.7	----	----	----	----	8
27 - 30		11.2	-9.4	----	----	----	----	4
30 - 33	12,000	13.1	-14.0	----	----	----	----	13
33 - 36		18.7	-17.2	----	----	----	----	8
36 - 39	12,500	13.4	-11.5	----	----	----	----	9
39 - 42		4.7	-12.5	----	----	----	----	8
42 - 45	12,000	13.1	-8.7	8.2	-7.4	87	148	13
45 - 48		10.0	-10.9	----	----	----	----	13
48 - 51		17.8	-8.1	----	----	----	----	12
51 - 54		18.7	-11.9	3.2	----	156	----	7
54 - 57	12,500	13.1	-12.5	----	----	----	----	9
57 - 60		15.0	-2.5	----	----	----	----	11
60 - 63		10.3	-9.7	----	----	----	----	13
63 - 66		7.2	-7.2	----	----	----	----	7
66 - 69		5.6	----	10.9	----	63	----	3
69 - 72		5.9	-4.1	----	-2.0	----	160	7
72 - 75		6.9	-2.5	5.4	-5.8	327	226	5
75 - 78		----	-3.7	----	-4.7	----	174	4
78 - 81		6.6	-1.2	12.8	----	239	----	4
81 - 84		6.2	----	9.5	----	70	----	2
Airplane 345 { Time (EST) - (a) Traverse 1 { Length of traverse 251.3 sec, 75,604 ft Initial heading (deg) - (a)								
0 - 3	6,000	14.1	-2.9	----	----	----	----	2
3 - 6		3.2	-18.2	----	----	----	----	7
6 - 9		----	----	----	----	----	----	0
9 - 12		2.9	----	----	----	----	----	1
12 - 15		----	----	----	----	----	----	0
15 - 18		2.6	-2.9	----	----	----	----	2
18 - 21		12.8	-15.7	----	----	----	----	3
21 - 24		14.7	-12.2	20.3	-7.4	211	29	6

<sup>a</sup>No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
September 18, 1946 - Flight 38								
Airplane 345 Traverse 1		{ Time (EST) - (a) Length of traverse 251.3 sec, 75,604 ft Initial heading (deg) - (a)						
24 - 27	6,000	9.3	-----	15.5	-----	289	---	2
27 - 30		8.3	-4.8	-----	-----	---	---	10
30 - 33		19.2	-8.3	-----	-----	---	---	8
33 - 36		13.4	-12.2	10.5	-15.7	167	258	7
36 - 39		7.4	-5.4	-----	-9.1	---	61	9
39 - 42		12.2	-6.7	-----	-----	---	---	7
42 - 45		8.3	-6.4	-----	-----	---	---	8
45 - 48		16.3	-4.8	-----	-----	---	---	13
48 - 51		9.6	-8.3	-----	-----	---	---	7
51 - 54		7.4	-9.6	14.4	-----	301	---	5
54 - 57		5.8	-4.5	-----	-----	---	---	5
57 - 60		6.1	-8.3	-----	-----	---	---	8
60 - 63		6.4	-6.7	10.9	-----	59	---	7
63 - 66		14.1	-7.7	25.4	-----	209	---	5
66 - 69		2.6	-7.4	-----	-----	---	---	4
69 - 72		5.4	-2.6	8.9	-----	419	---	3
72 - 75		-----	-5.1	-----	-4.3	---	280	2
75 - 78		-----	-----	-----	-----	---	---	0
Airplane 345 Traverse 2		{ Time (EST) - (a) Length of traverse 262.3 sec, 73,330 ft Initial heading (deg) - (a)						
0 - 3	6,000	3.2	-4.8	-----	-----	---	---	2
3 - 6		3.2	-2.9	-----	-8.1	---	312	4
6 - 9		6.1	-2.9	-----	-----	---	---	5
9 - 12	5,500	6.1	-3.0	-----	-----	---	---	4
12 - 15		7.6	-4.5	-----	-----	---	---	7
15 - 18		3.5	-2.9	-----	-----	---	---	3
18 - 21		4.1	-----	-----	-----	---	---	2
21 - 24		-----	-2.9	-----	-----	---	---	1
24 - 27		3.2	-2.9	-----	-----	---	---	3

<sup>a</sup>No records obtained



TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity U <sub>e</sub> <sub>max</sub> (fps)	Maximum true gust velocity U <sub>t</sub> <sub>max</sub> (fps)	Gust gradient distance (ft)	No. of gusts	
September 18, 1946 - Flight 38						
Airplane 345 Traverse 2		{ Time (EST) - (a) { Length of traverse 262.3 sec, 73,330 ft { Initial heading (deg) - (a)				
27 - 30	5,500	5.1	-6.1	----	3	
30 - 33		-----	-3.5	-----	2	
33 - 36		4.5	-2.5	-----	4	
36 - 39		5.1	-2.9	-----	3	
39 - 42		6.4	-10.8	-----	8	
42 - 45		14.3	-9.2	-9.4	161	9
45 - 48		6.7	-9.6	-----	7	
48 - 51		12.1	-8.3	-----	8	
51 - 54	6,000	9.2	-8.0	-----	8	
54 - 57		8.0	-9.6	-----	9	
57 - 60		11.5	-10.8	-----	6	
60 - 63		9.2	-12.1	-----	8	
63 - 66		9.6	-6.4	-4.7	82	6
66 - 69		6.4	-12.1	-----	6	
69 - 72		4.8	-2.2	-----	4	
72 - 75		3.2	-2.9	-----	2	
Airplane 345 Traverse 3		{ Time (EST) - (a) { Length of traverse 293.7 sec, 84,010 ft { Initial heading (deg) - (a)				
0 - 3	6,000	3.2	-4.1	----	2	
3 - 6		-----	-----	-----	0	
6 - 9		-----	-----	-----	0	
9 - 12		-----	-----	-----	0	
12 - 15		4.1	-----	-----	1	
15 - 18		4.1	-----	-----	1	
18 - 21		3.2	-----	-----	1	
21 - 24		3.2	-2.8	-----	4	
24 - 27		5.7	-5.7	-----	4	
27 - 30		5.0	-3.2	-----	6	
30 - 33		5.0	-4.1	-----	7	
33 - 36		5.0	-2.5	-----	3	

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity U <sub>e</sub> <sub>max</sub> (fps)	Maximum true gust velocity U <sub>t</sub> <sub>max</sub> (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 345 { Time (EST) - (a) Traverse 3 { Length of traverse 293.7 sec, 84,010 ft Initial heading (deg) - (a)					
36 - 39	6,000	6.3	-6.6	----	10
39 - 42		7.9	-4.4	4.5	4
42 - 45		6.9	-5.0	----	13
45 - 48		6.3	-8.2	----	6
48 - 51		3.8	-6.3	----	4
51 - 54		5.0	-8.5	----	7
54 - 57		9.5	-7.9	14.8	9
57 - 60		9.5	-6.6	----	6
60 - 63		6.6	-8.5	----	5
63 - 66		6.3	-4.4	----	4
66 - 69		4.7	-4.4	----	9
69 - 72		7.6	-5.7	----	6
72 - 75		5.7	-8.2	-9.1	59
75 - 78		4.1	----	----	1
78 - 81		----	----	----	0
81 - 84		----	----	----	0
84 - 87		----	----	----	0
Airplane 345 { Time (EST) - (a) Traverse 4 { Length of traverse 260.8 sec, 73,621 ft Initial heading (deg) - (a)					
0 - 3	5,500	2.8	-2.8	----	4
3 - 6		----	-4.1	----	2
6 - 9		3.1	-2.8	-5.6	84
9 - 12		----	-6.0	-6.4	138
12 - 15		7.5	-3.5	----	5
15 - 18		8.2	-6.0	-5.7	81
18 - 21		6.3	-7.9	----	7
21 - 24		9.4	-4.7	----	7
24 - 27		8.5	-6.6	----	10
27 - 30		6.0	-10.1	----	11
30 - 33		13.8	-12.2	-12.7	81

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts
September 18, 1946 - Flight 38					
Airplane 345 { Time (EST) - (a) Traverse 4 { Length of traverse 260.8 sec, 73,621 ft Initial heading (deg) - (a)					
33 - 36	5,500	19.5	-14.4	----	9
36 - 39		14.8	-8.5	----	7
39 - 42		4.5	-8.2	-17.0	7
42 - 45	6,000	11.0	-7.2	17.1	9
45 - 48		6.9	-8.5	17.5	6
48 - 51		5.7	-3.1	----	6
51 - 54		6.0	-9.1	-6.0	9
54 - 57		8.5	-18.8	-4.4	7
57 - 60		15.7	-11.0	----	9
60 - 63		11.6	-2.8	----	5
63 - 66		9.4	-4.1	----	3
66 - 69		3.1	-6.0	----	2
69 - 72		----	-9.1	-21.6	1
72 - 75		----	-3.1	----	2
Airplane 345 { Time (EST) - (a) Traverse 5 { Length of traverse 288.0 sec, 75,156 ft Initial heading (deg) - (a)					
0 - 3	5,500	3.9	-2.8	-8.5	8
3 - 6		5.9	-2.8	----	6
6 - 9		4.4	-4.7	----	4
9 - 12		9.1	-5.6	-12.7	10
12 - 15		9.1	-4.4	----	6
15 - 18		14.1	-10.6	----	9
18 - 21		9.4	-13.4	----	9
21 - 24		5.5	-5.0	11.4	7
24 - 27		5.6	-5.3	----	4
27 - 30		4.4	----	----	1
30 - 33		15.0	-8.1	----	7
33 - 36		5.6	-3.1	----	4
36 - 39		5.3	-10.9	5.9	9

<sup>a</sup>No records obtained.

TABLE I.- SUMMARY OF GUST MEASUREMENTS - Concluded

Space interval ft x 10 <sup>3</sup>	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)	Maximum true gust velocity $U_{t_{max}}$ (fps)	Gust gradient distance (ft)	No. of gusts			
September 18, 1946 - Flight 38								
Airplane 345 Traverse 5		{ Time (EST) - (a) Length of traverse 288.0 sec, 75,156 ft Initial heading (deg) - (a)						
39 - 42	5,500	11.6	-12.2	12.8	-----	200	---	8
42 - 45		12.2	-11.2	10.0	-----	81	---	9
45 - 48		15.0	-11.2	-----	-----	---	---	7
48 - 51		13.7	-6.9	-----	-----	---	---	7
51 - 54		6.9	-4.4	-----	-----	---	---	4
54 - 57		10.0	-5.0	-----	-----	---	---	9
57 - 60		8.1	-14.7	12.0	-----	49	---	10
60 - 63		10.9	-5.3	5.9	-----	52	---	7
63 - 66		9.1	-6.2	-----	-----	---	---	8
66 - 69		8.1	-6.2	-----	-----	---	---	7
69 - 72		4.4	-6.2	12.0	-----	283	---	6
72 - 75		7.5	-3.4	18.1	-----	233	---	6
75 - 78		3.4	-----	-----	-----	---	---	1

<sup>a</sup>No records obtained.

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TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS FROM FLIGHTS  
OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Date	Flight no.	Air-plane no.	Assigned altitude (ft)	Tra-verse no.	Draft location from cloud entry (ft)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
9-17-46	37	331	16,000	a <sub>1</sub>				
				a <sub>2</sub>				
				3	4,283	14,000	9,717	25.7
		345		1	6,359 17,944	8,682 21,092	2,330 3,148	23.2 -17.2
				a <sub>2</sub>				
				3	5,978	13,000	7,022	19.3
		348		a <sub>4</sub>				
				a <sub>1</sub>				
				2	5,312 22,543	12,676 25,987	7,364 3,444	-12.3 23.1
		351		a <sub>3</sub>				
				a <sub>1</sub>				
				2	8,520 14,680	13,148 23,960	4,928 9,280	19.4 -11.0
9-18-46	38	348	21,000	a <sub>3</sub>				
				1	42,408	60,932	18,524	29.3
				2	68,511	82,207	13,696	19.4
				3	42,075 54,384	45,972 61,454	3,897 7,070	-19.7 11.9
				4	10,963 18,645 26,900	16,841 22,101 35,676	5,878 3,456 8,776	-13.1 22.2 26.1

<sup>a</sup>No draft velocities indicated by records.

TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS - Continued

Date	Flight no.	Air-plane no.	Assigned altitude (ft)	Tra-verse no.	Draft location from cloud entry (ft)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
9-18-46	38	348	21,000	5	6,098	9,844	3,746	28.3
					36,943	45,554	8,611	20.5
					117,418	121,685	4,267	-18.4
					130,716	134,714	3,998	19.6
		333	16,000	1	35,371	43,054	7,683	23.4
				2	22,457	28,900	6,443	14.7
					28,900	37,100	8,200	-14.1
					67,017	73,939	6,921	13.8
				3				
				4	14,289	26,011	11,722	21.5
					29,746	34,326	4,580	16.3
					36,281	39,754	3,473	-21.7
				5	24,508	42,399	17,891	27.2
					46,842	63,816	16,974	15.6
					63,816	70,434	6,618	-19.7
		331	11,000	1	30,948	42,344	11,396	23.5
				2	6,112	17,822	11,710	7.2
					19,500	27,113	7,613	-11.1
					41,160	47,447	6,287	12.9
					52,888	64,647	11,759	20.7
					64,647	70,443	5,796	-20.4
				3	54,254	62,732	8,478	9.2
					62,732	67,756	5,024	-15.5
				4	15,309	22,651	7,342	10.7
					32,725	42,071	9,346	41.7
				5	19,440	22,362	2,922	52.0
					29,652	39,308	9,656	47.1
					39,308	46,200	6,892	-18.6
					53,802	64,449	10,647	15.2

<sup>a</sup>No draft velocities indicated by records.

TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS - Concluded

Date	Flight no.	Air- plane no.	Assigned altitude	Tra- verse no.	Draft location from cloud entry (ft)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
9-18-46	38	345	6,000	1	53,818	59,556	5,738	20.1
				2	39,175	42,801	3,626	-22.9
					42,801	66,660	23,859	9.9
				3	43,133	53,447	10,314	7.3
				4	35,844	55,403	19,559	12.0
				5	30,205	38,408	8,203	12.4
					44,410	50,820	6,410	-18.3
					50,820	60,081	9,261	8.1

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TABLE III.- SUMMARY OF INDICATIONS OF AMBIENT  
AIR TEMPERATURE WITHIN THUNDERSTORMS

Date	Flight no.	Airplane no.	Traverse no.	Time (EST)	Distance from cloud entry (ft)	Milliammeter reading
9-17-46	37	331	3	145326	0	120
				145345	5,800	130
				145400	10,200	140
				145415	14,800	150
				145430	19,200	150
9-18-46	38	331	1	142722	0	300
				142745	6,800	300
				142800	11,300	310
				142815	16,000	315
				142830	20,500	310
				142845	25,000	310
				142900	29,900	305
				142915	34,800	305
				142930	39,400	310
				142945	43,900	330
				143000	48,800	330
				143015	53,200	340
				143030	57,800	340
				143045	62,200	330
				143100	67,100	340
			5	150800	0	300
				150815	4,500	310
				150830	9,000	320
				150930	27,500	320
				150945	32,200	315
				151000	36,900	330
				151015	41,500	340
				151030	46,000	350
				151045	50,500	340
				151115	60,300	340
				151130	65,000	350
				151145	69,800	360
				151200	74,500	350

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